

Application No. 08/484,928
Amendment dated August 25, 2003
Reply to Office Action of February 24, 2003

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

~~1-172 (cancelled)~~

173. (currently amended) A non-threaded interbody spinal fusion implant for insertion across the surgically corrected height of a disc space between adjacent vertebral bodies of a human spine, the implant comprising:

a body having a mid-longitudinal axis, an insertion end, a trailing end, a length between said ends, an upper portion adapted to be oriented toward one of the adjacent vertebral bodies, a lower portion adapted to be oriented toward the other of the adjacent vertebral bodies, and a height between said upper portion and said lower portion transverse to the length, the height of said upper and lower portions along a portion of the length of said implant being constant, said body having at least two openings in communication with one another for permitting the growth of bone from adjacent vertebral body to adjacent vertebral body through said implant; and

a non-threaded bone engaging means extending from at least a portion of said upper and lower portions adapted to engage said implant to the adjacent vertebral bodies of the spine when implanted in the spine, said bone engaging means having a maximum height that increases from one of said ends to the other of said ends along at least a portion of the length of said body where the height of said upper and lower portions is constant, said implant being made of a material appropriate for human implantation.

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174. (previously presented) The spinal fusion implant of claim 173 in which said body includes two opposed sides between said upper and lower portions, said sides being planar along at least a portion of the length r.
175. (previously presented) The spinal fusion implant of claim 173 in which said upper and lower surfaces form at least a portion of a cylinder.
176. (previously presented) The spinal fusion implant of claim 173 in which said implant comprises a bone ingrowth material.
177. (previously presented) The spinal fusion implant of claim 173 in which said implant comprises a fusion promoting material.
178. (previously presented) The spinal fusion implant of claim 173 in which said implant is at least in part bioabsorbable.
179. (previously presented) The spinal fusion implant of claim 173 in which said body has a plurality of openings adapted to retain fusion promoting material.
180. (previously presented) The spinal fusion implant of claim 173 in which said bone engaging means includes an outer surface that is at least in part porous.
181. (previously presented) The spinal fusion implant of claim 173 in which said bone engaging means comprises a plurality of posts spaced apart along at least a portion of the outer surface of said body.
182. (previously presented) The spinal fusion implant of claim 181 in which said plurality of posts have a head portion and a stem portion said head portion having a wider diameter than said stem portion.
183. (previously presented) The spinal fusion implant of claim 173 in which said bone engaging means comprises a mesh-like material having a plurality of interstices for receiving fusion promoting material.
184. (previously presented) The spinal fusion implant of claim 173 in which said bone engaging means includes a plurality of surface roughenings for engaging the adjacent vertebral bodies and for maintaining said implant in place, said surface

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- roughenings being present on at least a portion of said outer surface of said implant.
185. (previously presented) The spinal fusion implant of claim 184 in which said surface roughenings include a plurality of ratchetings.
186. (previously presented) The spinal fusion implant of claim 184 in which said surface roughenings include knurling.
187. (previously presented) The spinal fusion implant of claim 173 in which said body has an internal chamber and means for accessing said internal chamber.
188. (previously presented) The spinal fusion implant of claim 187 in which said internal chamber is capable of containing fusion promoting material.
189. (previously presented) The spinal fusion implant of claim 187 in which said body includes a wall surrounding said internal chamber.
190. (previously presented) The spinal fusion implant of claim 189 in which said wall has a plurality of openings passing therethrough in communication with said internal chamber.
191. (previously presented) The spinal fusion implant of claim 187 in which said body has a cap for closing said accessing means.
192. (previously presented) The spinal fusion implant of claim 173 in which said implant includes an engagement means for engaging instrumentation for the insertion of said implant.
193. (previously presented) The spinal fusion implant of claim 173 in which at least a portion of said outer surface comprises wells having at least partial walls.
194. (previously presented) The spinal fusion implant of claim 173 in which said implant is configured to be placed in close proximity in a side by side alignment to a second spinal fusion implant, said first and second implants when placed together having a combined overall width that is less than the sum of the individual maximum diameters of each of said first and second implants.

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195. (previously presented) The spinal fusion implant of claim 173 in which said body has at least one truncated side forming a planar surface parallel to the mid-longitudinal axis.
196. (previously presented) The spinal fusion implant of claim 173, in combination with a fusion promoting material.
197. (currently amended) The spinal fusion implant of claim 156, wherein said fusion promoting material includes at least one of bone, bone morphogenesis morphogenetic protein, hydroxyapatite, hydroxyapatite compounds, and osteogenic proteins.
- X 198. (currently amended) A non-threaded interbody spinal fusion implant for insertion across the surgically corrected height of a disc space between two adjacent vertebral bodies of a human spine, said implant comprising a body having a substantially frusto-conical configuration along a sufficient portion of said body that is adapted to contact the adjacent vertebral bodies when implanted in the spine so as to maintain an angulation of the adjacent vertebral bodies relative to one another, said body having an insertion end, a trailing end, and an outer surface including bone engaging means for engaging said implant to the adjacent vertebral bodies, the locus of said bone engaging means forming a substantially cylindrical configuration, said implant being made of a material appropriate for human implantation.
199. (previously presented) The spinal fusion implant of claim 198 in which said trailing end is larger than said insertion end.
200. (cancelled)
201. (previously presented) The spinal fusion Implant of claim 198 in which said implant comprises a bone ingrowth material.
202. (previously presented) The spinal fusion implant of claim 198 in which said implant comprises a fusion promoting material.

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203. (previously presented) The spinal fusion implant of claim 198 in which said implant is at least in part bioabsorbable.
 204. (previously presented) The spinal fusion implant of claim 198 in which said body has a plurality of openings for retaining fusion promoting material.
 205. (previously presented) The spinal fusion implant of claim 198 in which said bone engaging means includes said outer surface being porous at least in part.
 206. (previously presented) The spinal fusion implant of claim 198 in which said bone engaging means comprises a plurality of posts spaced apart along at least a portion of the outer surface of said body.
 207. (previously presented) The spinal fusion implant of claim 206 in which said plurality of posts have a head portion and a stem portion, said head portion having a wider diameter than said stem portion.
 208. (previously presented) The spinal fusion implant of claim 198 in which said bone engaging means comprises a mesh-like material having a plurality of interstices for receiving fusion promoting material.
 209. (previously presented) The spinal fusion implant of claim 198 in which said bone engaging means includes a plurality of surface roughenings for engaging said adjacent vertebral bodies and for maintaining said implant in place, said surface roughenings being present on at least a portion of said outer surface of said implant.
 210. (previously presented) The spinal fusion implant of claim 209 in which said surface roughenings include a plurality of ratchetings.
 211. (previously presented) The spinal fusion implant of claim 209 in which said surface roughenings include knurling.
 212. (previously presented) The spinal fusion implant of claim 198 in which said body has an internal chamber and means for accessing said internal chamber.
 213. (previously presented) The spinal fusion implant of claim 212 in which said internal chamber is capable of containing fusion promoting material.

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214. (previously presented) The spinal fusion implant of claim 212 in which said body includes a wall surrounding said internal chamber.
215. (previously presented) The spinal fusion implant of claim 212 in which said wall has a plurality of openings passing therethrough in communication with said internal chamber.
216. (previously presented) The spinal fusion implant of claim 212 in which said body has a cap for closing said accessing means.
217. (previously presented) The spinal fusion implant of claim 198 in which one of said ends includes an engagement means for engaging instrumentation for the insertion of said implant.
218. (previously presented) The spinal fusion implant of claim 198 in which at least a portion of said outer surface comprises wells having at least partial walls.
219. (previously presented) The spinal fusion implant of claim 198 in which said implant is configured to be placed in close proximity in a side by side alignment to a second spinal fusion implant, said first and second implants when placed together having a combined overall width that is less than the sum of the individual maximum diameters of each of said first and second implants.
220. (previously presented) The spinal fusion implant of claim 198 in which said body has a longitudinal central axis and at least one truncated side forming a planar surface parallel to said central axis.
221. (previously presented) The spinal fusion implant of claim 198, in combination with a fusion promoting material.
222. (currently amended) The spinal fusion implant of claim 221, wherein said fusion promoting material includes at least one of bone, bone ~~morphogenic~~ morphogenetic protein, hydroxyapatite, hydroxyapatite compounds, and osteogenic proteins.
223. (currently amended) A non-threaded interbody spinal fusion implant for insertion across the surgically corrected height of a disc space between the adjacent

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vertebral bodies, the implant comprising a body having a substantially frusto-conical configuration along a sufficient portion of said body that is adapted to contact the adjacent vertebral bodies when implanted in the spine so as to maintain an angulation of the adjacent vertebral bodies relative to one another, said body having at least two openings in communication with one another for permitting the growth of bone from adjacent vertebral body to adjacent vertebral body through said implant, said body having an insertion end, a trailing end being larger than said insertion end, and an outer surface including bone engaging projections for engaging said implant to the adjacent vertebral bodies, the outer locus of said bone engaging projections forming a substantially frusto-conical configuration, at least one of said bone engaging projections having a forward portion oriented toward said insertion end and being ramped to facilitate linear insertion of said implant into the disc space and having a rearward portion oriented toward said trailing end adapted to resist expulsion of said implant in a direction opposite to the direction of insertion, said implant being made of a material appropriate for human implantation.

224. (previously presented) The spinal fusion implant of claim 223 in which said implant comprises a bone ingrowth material.
225. (previously presented) The spinal fusion implant of claim 223 in which said implant comprises a fusion promoting material.
226. (previously presented) The spinal fusion implant of claim 223 in which said implant is at least in part bioabsorbable.
227. (previously presented) The spinal fusion implant of claim 223 in which said body includes a plurality of openings adapted to retain fusion promoting material.
228. (previously presented) The spinal fusion implant of claim 223 in which said bone engaging projections include said outer surface being at least in part porous.
- 229-230. (cancelled)

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231. (previously presented) The spinal fusion implant of claim 223 in which said bone engaging projections comprise a mesh-like material having a plurality of interstices adapted to receive fusion promoting material.
232. (previously presented) The spinal fusion implant of claim 223 in which said bone engaging projections include a plurality of surface roughenings for engaging said adjacent vertebral bodies and for maintaining said implant in place, said surface roughenings being present on at least a portion of said outer surface of said implant.
233. (previously presented) The spinal fusion implant of claim 232 in which said surface roughenings include a plurality of ratchetings.
234. (cancelled)
235. (previously presented) The spinal fusion implant of claim 223 in which said implant has an internal chamber and means for accessing said internal chamber.
236. (previously presented) The spinal fusion implant of claim 235 in which said internal chamber is configured to contain fusion promoting material.
237. (previously presented) The spinal fusion implant of claim 235 in which said body includes a wall surrounding said internal chamber.
238. (previously presented) The spinal fusion implant of claim 237 in which said wall has a plurality of openings passing therethrough in communication with said internal chamber.
239. (previously presented) The spinal fusion implant of claim 235 in which said body has a cap for closing said accessing means.
240. (previously presented) The spinal fusion implant of claim 223 in which one of said ends includes an engagement means for engaging instrumentation for the insertion of said implant.
241. (previously presented) The spinal fusion implant of claim 223 in which at least a portion of said outer surface comprises wells having at least partial walls.

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242. (previously presented) The spinal fusion implant of claim 223 in which said implant is configured to be placed in close proximity in a side by side alignment to a second spinal fusion implant, said first and second implants when placed together having a combined overall width that is less than the sum of the individual maximum diameters of each of said first and second implants.
243. (previously presented) The spinal fusion implant of claim 223 in which said body has a longitudinal central axis and at least one truncated side forming a planar surface parallel to said central axis.
244. (previously presented) The spinal fusion implant of claim 223, in combination with a fusion promoting material.
245. (currently amended) The spinal fusion implant of claim 244, wherein said fusion promoting material includes at least one of bone, bone morphogenetic morphogenetic protein, hydroxyapatite, hydroxyapatite compounds, and osteogenic proteins.
246. (currently amended) A non-threaded interbody spinal fusion implant for insertion across the surgically corrected height of a disc space between adjacent vertebral bodies of a human spine, the implant comprising a body having an insertion end, a trailing end, and an outer surface including a plurality of posts having a head and a stem, said head being wider than said stem, said stem having a first portion proximate said head and a second portion proximate said body, a maximum dimension transverse to the length of said stem at said second portion being smaller than a maximum dimension transverse to the length of said stem at said first portion, said posts being spaced apart along at least a portion of said outer surface of said body for engaging said implant to adjacent vertebral bodies of the spine, said body having at least two openings in communication with one another for permitting the growth of bone from adjacent vertebral body to adjacent vertebral body through said implant, said implant being made of a material appropriate for human implantation.

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247. (previously presented) The spinal fusion implant of claim 246 in which said implant comprises a bone ingrowth material.
248. (previously presented) The spinal fusion implant of claim 246 in which said implant comprises a fusion promoting material.
249. (previously presented) The spinal fusion implant of claim 246 in which said implant is at least in part bioabsorbable.
250. (previously presented) The spinal fusion implant of claim 246 in which said body includes a plurality of openings adapted to retain fusion promoting material.
251. (previously presented) The spinal fusion implant of claim 246 in which said outer surface is at least in part porous.
252. (previously presented) The spinal fusion implant of claim 246 further comprising a plurality of surface roughenings for engaging said adjacent vertebral bodies and for maintaining said implant in place, said surface roughenings being present on at least a portion of said outer surface of said body.
- 253-254. (cancelled)
255. (previously presented) The spinal fusion implant of claim 246 in which said implant has an internal chamber and means for accessing said internal chamber.
256. (previously presented) The spinal fusion implant of claim 255 in which said internal chamber is adapted to contain fusion promoting material.
257. (previously presented) The spinal fusion implant of claim 255 in which said body includes a wall surrounding said internal chamber.
258. (previously presented) The spinal fusion implant of claim 257 in which said wall has a plurality of openings passing therethrough in communication with said internal chamber.
259. (previously presented) The spinal fusion implant of claim 255 in which said body has a cap for closing said accessing means.
260. (previously presented) The spinal fusion implant of claim 246 in which one of said ends includes an engagement means for engaging instrumentation for the

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insertion of said implant.

261. (previously presented) The spinal fusion implant of claim 246 in which at least a portion of said outer surface comprises wells having at least partial walls.
262. (previously presented) The spinal fusion implant of claim 246 in which said implant is configured to be placed in close proximity in a side by side alignment to a second spinal fusion implant, said first and second implants when placed together having a combined overall width that is less than the sum of the individual maximum diameters of each of said first and second implants.
263. (currently amended) The spinal fusion implant of claim 246 ~~is which~~, wherein said implant is made of a material that is stronger than bone.
264. (previously presented) The spinal fusion implant of claim 246, in combination with a fusion promoting material.
265. (currently amended) The spinal fusion implant of claim 264, wherein said fusion promoting material includes at least one of bone, bone morphogenic morphogenetic protein, hydroxyapatite, hydroxyapatite compounds, and osteogenic proteins.
266. (currently amended) A non-threaded interbody spinal fusion implant for insertion across the surgically corrected height of a disc space between two adjacent vertebral bodies of a human spine, the implant comprising a body having a substantially frusto-conical configuration along a sufficient portion of said body that is adapted to contact the adjacent vertebral bodies when implanted in the spine so as to maintain an angulation of the adjacent vertebral bodies relative to one another, said body having at least two openings in communication with one another for permitting the growth of bone from adjacent vertebral body to adjacent vertebral body through said implant, said body having an insertion end, a trailing end being larger than said insertion end, and an outer surface including bone engaging projections for engaging said implant to the adjacent vertebral bodies, said bone engaging projections having a forward portion oriented toward

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said insertion end and being ramped to facilitate linear insertion of said implant into the disc space and having a rearward portion oriented toward said trailing end adapted to resist expulsion of said implant in a direction opposite to the direction of insertion, said implant being made of a material appropriate for human implantation.

267. (previously presented) The spinal fusion implant of claim 266 in which said insertion end is tapered.
268. (previously presented) The spinal fusion implant of claim 266 in which said implant comprises a bone ingrowth material.
269. (previously presented) The spinal fusion implant of claim 266 in which said implant comprises a fusion promoting material.
270. (previously presented) The spinal fusion implant of claim 266 in which said implant is at least in part bioabsorbable.
271. (previously presented) The spinal fusion implant of claim 266 in which said body includes a plurality of openings adapted to retain fusion promoting material.
272. (previously presented) The spinal fusion implant of claim 266 in which said bone engaging projections include said outer surface being at least in part porous.
- 273-274. (cancelled)
275. (previously presented) The spinal fusion implant of claim 266 in which said bone engaging projections comprise a mesh-like material having a plurality of interstices adapted to receive fusion promoting material.
276. (previously presented) The spinal fusion implant of claim 266 in which said bone engaging projections include a plurality of surface roughenings for engaging said adjacent vertebral bodies and for maintaining said implant in place, said surface roughenings being present on at least a portion of said outer surface of said implant.
277. (previously presented) The spinal fusion implant of claim 276 in which said surface roughenings include a plurality of ratchetings.

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278. (cancelled)

279. (previously presented) The spinal fusion implant of claim 266 in which said implant has an internal chamber and means for accessing said internal chamber.
280. (previously presented) The spinal fusion implant of claim 279 in which said internal chamber is configured to contain fusion promoting material.
281. (previously presented) The spinal fusion implant of claim 279 in which said body includes a wall surrounding said internal chamber.
282. (previously presented) The spinal fusion implant of claim 281 in which said wall has a plurality of openings passing therethrough in communication with said internal chamber.
283. (previously presented) The spinal fusion implant of claim 279 in which said body has a cap for closing said accessing means.
284. (previously presented) The spinal fusion implant of claim 266 in which one of said ends includes an engagement means for engaging instrumentation for the insertion of said implant.
285. (previously presented) The spinal fusion implant of claim 266 in which at least a portion of said outer surface comprises wells having at least partial walls.
286. (previously presented) The spinal fusion implant of claim 266 in which said implant is configured to be placed in close proximity in a side by side alignment to a second spinal fusion implant, said first and second implants when placed together having a combined overall width that is less than the sum of the individual maximum diameters of each of said first and second implants.
287. (previously presented) The spinal fusion implant of claim 266 in which said body has a longitudinal central axis and at least one truncated side forming a planar surface parallel to said central axis.
288. (currently amended) The spinal fusion implant of claim 266 ~~is which, wherein~~ said implant is made of a material that is stronger than bone.

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289. (previously presented) The spinal fusion implant of claim 266, in combination with a fusion promoting material.
290. (currently amended) The spinal fusion implant of claim 289, wherein said fusion promoting material includes at least one of bone, bone ~~morphogenic~~ morphogenetic protein, hydroxyapatite, hydroxyapatite compounds, and osteogenic proteins.
291. (Allowed) A non-threaded interbody spinal fusion implant for insertion across the surgically corrected height of a disc space between adjacent vertebral bodies of a human spine, the implant comprising a body having an insertion end, a trailing end being larger than said insertion end, a length between said ends, and an outer surface including bone engaging projections for engaging said implant to adjacent vertebral bodies of the spine, said body having at least two openings in communication with one another for permitting the growth of bone from adjacent vertebral body to adjacent vertebral body through said implant, the outer locus of said bone engaging projections forming a substantially frusto-conical configuration along at least a portion of said bone engaging projections that is adapted to contact the adjacent vertebral bodies when implanted in the spine, said substantially frusto-conical configuration being along at least a portion of the length of said implant nearer said trailing end than said insertion end, said bone engaging projections having a forward portion oriented toward said insertion end and being ramped to facilitate linear insertion of said implant in the disc space, said implant being made of a material appropriate for human implantation.
292. (previously presented) The spinal fusion implant of claim 291 in which said body has a substantially frusto-conical configuration along a portion of said outer surface oriented toward said adjacent vertebral bodies.
293. (previously presented) The spinal fusion implant of claim 291 in which said body has a substantially cylindrical configuration along a portion of said outer surface oriented toward said adjacent vertebral bodies.

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294. (cancelled)
295. (previously presented) The spinal fusion implant of claim 291 in which said bone engaging projections comprise a mesh-like material having a plurality of interstices adapted to receive fusion promoting material.
296. (previously presented) The spinal fusion implant of claim 291 in which said bone engaging projections include a plurality of surface roughenings for engaging said adjacent vertebral bodies and for maintaining said implant in place, said surface roughenings being present on at least a portion of said outer surface of said implant.
297. (previously presented) The spinal fusion implant of claim 291 in which said body includes a longitudinal central axis and at least one truncated side forming a planar surface parallel to said central axis.
298. (currently amended) The spinal fusion implant of claim 291 ~~is which~~, wherein said implant is made of a material that is stronger than bone.
299. (previously presented) The spinal fusion implant of claim 291, in combination with a fusion promoting material.
300. (currently amended) The spinal fusion implant of claim 299, wherein said fusion promoting material includes at least one of bone, bone morphogenic morphogenetic protein, hydroxyapatite, hydroxyapatite compounds, and osteogenic proteins.
301. (currently amended) A non-threaded spinal fusion implant for insertion across the surgically corrected height of a disc space between adjacent vertebral bodies of a human spine, said implant comprising a mid-longitudinal axis and a body having an outer locus larger than the space between two adjacent vertebral bodies to be fused and being formed of a mesh-like material other than bone capable of supporting two adjacent vertebral bodies in a spaced apart relationship to each other, said mesh-like material having a plurality of interstices adapted to receive fusion promoting material and for engaging said implant to

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- said adjacent vertebral bodies of the spine, said interstices being along at least a portion of said outer locus of said body and within at least a portion of an interior of said body, said body being adapted to permit the growth of bone from adjacent vertebral body to adjacent vertebral body through said implant, said implant being made of a material appropriate for human implantation.
302. (previously presented) The spinal fusion implant of claim 301 including a plurality of openings in the outer locus of said implant.
303. (previously presented) The spinal fusion implant of claim 301 further comprising a plurality of surface roughenings for engaging said adjacent vertebral bodies and for maintaining said implant in place, said surface roughenings being present on at least a portion of said outer surface of said implant.
304. (previously presented) The spinal fusion implant of claim 301 in which said body includes a longitudinal central axis and at least one truncated side forming a planar surface parallel to said central axis.
305. (previously presented) The spinal fusion implant of claim 301 in which said mesh-like material comprises a metal.
306. (previously presented) The spinal fusion implant of claim 301, wherein said body has a hollow interior in communication with at least a portion of said interstices.
307. (previously presented) The spinal fusion implant of claim 301, in combination with a fusion promoting material.
308. (currently amended) The spinal fusion implant of claim 307, wherein said fusion promoting material includes at least one of bone, bone morphogenetic morphogenetic protein, hydroxyapatite, hydroxyapatite compounds, and osteogenic proteins.
309. (currently amended) A non-threaded interbody spinal fusion implant for insertion across the surgically corrected height of a disc space between two adjacent vertebral bodies of a human spine, the implant comprising a body having an insertion end, a trailing end, a length between said ends, and upper and lower

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arcuate portions adapted to contact the adjacent vertebral bodies when implanted in the spine, ~~and a distance between said arcuate portions increasing from said insertion end to said trailing end along a sufficient portion of the length of said implant so as to maintain angulation of the adjacent vertebral bodies relative to one another,~~ said body having at least two openings in communication with one another for permitting the growth of bone from adjacent vertebral body to adjacent vertebral body through said implant; and

bone engaging projections for engaging said implant to the adjacent vertebral bodies, said bone engaging projections extending from at least a portion of said upper and lower arcuate portions, said bone engaging projections having a maximum height as measured from each of said arcuate portions that increases from one of said ends to the other of said ends along at least a portion of the length of said body ~~at least one of said bone engaging projections having a forward portion oriented toward said insertion end and being ramped to facilitate linear insertion of said implant into the disc space.~~

310. (previously presented) The spinal fusion implant of claim 309 in which said bone engaging projections include second arcuate portions oriented toward the adjacent vertebral bodies.

{ 311-312. (cancelled) }

313. (currently amended) The spinal fusion implant of claim 309, wherein ~~311 in which~~ said bone engaging projections comprise a mesh-like material having a plurality of interstices adapted to receive fusion promoting material.

314. (currently amended) The spinal fusion implant of claim 309, wherein ~~311 in which~~ said bone engaging projections include a plurality of surface roughenings for engaging said adjacent vertebral bodies and for maintaining said implant in place, said surface roughenings being present on at least a portion of said outer surface of said implant.

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315. (previously presented) The spinal fusion implant of claim 314 in which said surface roughenings include a plurality of ratchetings.

316. (cancelled)

317. (currently amended) The spinal fusion implant of claim 309 ~~is which, wherein~~ said implant is made of a material that is stronger than bone.

318. (previously presented) The spinal fusion implant of claim 309, in combination with a fusion promoting material.

319. (currently amended) The spinal fusion implant of claim 318, wherein said fusion promoting material includes at least one of bone, bone morphogenic morphogenetic protein, hydroxyapatite, hydroxyapatite compounds, and osteogenic proteins.

320. A non-threaded interbody spinal fusion implant for insertion across the surgically corrected height of a disc space between two adjacent vertebral bodies of a human spine, the implant comprising:

a body having a insertion end, a trailing end, a length between said ends, ~~and an outer surface, and including~~ bone engaging projections extending from said outer surface for engaging said implant to the adjacent vertebral bodies, said bone engaging projections having arcuate portions adapted to contact the adjacent vertebral bodies when implanted in the spine, said bone engaging projections having a distance between said arcuate portions and said outer surface of said body that increases from one of said ends to the other of said ends along at least a portion of the length of said body ~~and a distance between said arcuate portions increasing from said insertion end to said trailing end along a sufficient portion of the length of said implant~~ so as to maintain an angulation of the adjacent vertebral bodies relative to one another, ~~at least one of said bone engaging projections having a forward portion oriented toward said insertion end and being ramped to facilitate linear insertion of said implant into the disc space,~~ said body having at least two openings in communication with one another for

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permitting the growth of bone from adjacent vertebral body to adjacent vertebral body through said implant.

321-322. (cancelled)

323. (previously presented) The spinal fusion implant of claim 320 in which said bone engaging projections comprise a mesh-like material having a plurality of interstices adapted to receive fusion promoting material.

324. (previously presented) The spinal fusion implant of claim 320 in which said bone engaging projections include a plurality of surface roughenings for engaging said adjacent vertebral bodies and for maintaining said implant in place, said surface roughenings being present on at least a portion of said outer surface of said implant.

325. (previously presented) The spinal fusion implant of claim 324 in which said surface roughenings include a plurality of ratchetings.

326. (previously presented) The spinal fusion implant of claim 324 in which said surface roughenings include knurling.

327. (currently amended) The spinal fusion implant of claim 320 ~~is which~~, wherein said implant is made of a material that is stronger than bone.

328. (previously presented) The spinal fusion implant of claim 320, in combination with a fusion promoting material.

329. (currently amended) The spinal fusion implant of claim 328, wherein said fusion promoting material includes at least one of bone, bone morphogenetic ~~morphogenic~~ morphogenetic protein, hydroxyapatite, hydroxyapatite compounds, and osteogenic proteins.

330. (currently amended) A non-threaded spinal fusion implant for insertion across the surgically corrected height of a disc space between adjacent vertebral bodies of a human spine, said implant comprising a body having an outer locus larger than the space between two adjacent vertebral bodies to be fused and being formed of a cancellous material other than bone capable of supporting two

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- adjacent vertebral bodies in a spaced apart relationship to each other, said cancellous material having a plurality of interstices for holding fusion promoting material and for permitting the growth of bone from adjacent vertebral body to adjacent vertebral body through said ~~implant~~cancellous material, said implant being made of a material appropriate for human implantation.
331. (previously presented) The spinal fusion implant of claim 330 including a plurality of openings in the exterior surface of said implant.
332. (previously presented) The spinal fusion implant of claim 330 further comprising a plurality of surface roughenings for engaging said adjacent vertebral bodies and for maintaining said implant in place, said surface roughenings being present on at least a portion of said outer surface of said implant.
333. (previously presented) The spinal fusion implant of claim 330 in which said body includes a longitudinal central axis and at least one truncated side forming a planar surface parallel to said central axis.
334. (previously presented) The spinal fusion implant of claim 330, in combination with a fusion promoting material.
335. (currently amended) The spinal fusion implant of claim 334, wherein said fusion promoting material includes at least one of bone, bone morphogenic ~~morphogenic~~ morphogenetic protein, hydroxyapatite, hydroxyapatite compounds, and osteogenic proteins.
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336. (new) The spinal fusion implant of claim 301, wherein said body is adapted to permit the growth of bone along at least a portion of the length of the mid-longitudinal axis of said implant.
337. (new) The spinal fusion implant of claim 309, wherein said body includes two opposed sides between said upper and lower arcuate portions, said sides being planar along at least a portion of the length.
338. (new) The spinal fusion implant of claim 337, wherein said sides include at least one opening.

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339. (new) The spinal fusion implant of claim 337, wherein said sides are parallel to the central longitudinal axis of said body.
340. (new) The spinal fusion implant of claim 337, wherein said sides have a width therebetween that is less than the height between said upper and lower arcuate portions of said body.
341. (new) The spinal fusion implant of claim 309, wherein the height between said upper and lower arcuate portions is constant along at least a portion of the length of said body.
342. (new) The spinal fusion implant of claim 309, wherein said upper and lower arcuate portions form at least a portion of a cylinder.
343. (new) The spinal fusion implant of claim 309, wherein the height between said upper and lower arcuate portions increases from one of said ends to the other of said ends along at least a portion of the length of said body.
344. (new) The spinal fusion implant of claim 309, wherein said upper and lower arcuate portions are angled relative to one another.
345. (new) The spinal fusion implant of claim 309, wherein said body has a width that is less than the height between said upper and lower arcuate portions.
346. (new) The spinal fusion implant of claim 309, wherein said body includes at least one truncated side between said upper and lower arcuate portions.
347. (new) The spinal fusion implant of claim 309, wherein said body includes at least one side between said upper and lower arcuate portions that is adapted for side-by-side placement with a second implant within at least a portion of the same disc space.
348. (new) The spinal fusion implant of claim 309, wherein said bone engaging projections have a radius as measured from the central longitudinal axis of said body, the radius of said bone engaging projections increasing from one of said ends to the other of said ends along at least a portion of the length of said body.

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349. (new) The spinal fusion implant of claim 309, wherein said bone engaging projections have as an outer locus forming a generally frustoconical configuration along at least a portion of the length of said body.
350. (new) The spinal fusion implant of claim 309, wherein said bone engaging projections have a radius as measured from the central longitudinal axis of said body, the radius of said bone engaging projections being substantially constant from one of said ends to the other of said ends along at least a portion of the length of said body.
351. (new) The spinal fusion implant of claim 309, wherein said bone engaging projections have an outer locus forming a generally cylindrical configuration along at least a portion of the length of said body.
352. (new) The spinal fusion implant of claim 315, wherein said ratchets are configured to facilitate insertion of said implant between the adjacent vertebral bodies while resisting movement of said implant in a direction opposite to the direction of insertion.
353. (new) The spinal fusion implant of claim 315, wherein at least one of said ratchets includes an opening configured to permit bone growth therethrough.
354. (new) The spinal fusion implant of claim 309, wherein the maximum height of said bone engaging projections is between 0.25 to 2.0 mm.
355. (new) The spinal fusion implant of claim 309, further comprising a hollow.
356. (new) The spinal fusion implant of claim 355, wherein said hollow forms a chamber in communication with said openings, said chamber having an access opening for loading said chamber with fusion promoting substances.
357. (new) The spinal fusion implant of claim 309, wherein said implant is at least in part bioabsorbable.
358. (new) The spinal fusion implant of claim 320, wherein said body includes two opposed sides between said upper and lower arcuate portions, said sides being planar along at least a portion of the length.

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359. (new) The spinal fusion implant of claim 358, wherein said sides include at least one opening.
360. (new) The spinal fusion implant of claim 358, wherein said sides are parallel to the central longitudinal axis of said body.
361. (new) The spinal fusion implant of claim 358, wherein said sides have a width therebetween that is less than the height between said upper and lower arcuate portions of said body.
362. (new) The spinal fusion implant of claim 320, wherein said bone engaging projections have a radius as measured from the central longitudinal axis of said body, the radius of said bone engaging projections increasing from one of said ends to the other of said ends along at least a portion of the length of said body.
363. (new) The spinal fusion implant of claim 320, wherein said bone engaging projections have as an outer locus forming a generally frustoconical configuration along at least a portion of the length of said body.
364. (new) The spinal fusion implant of claim 320, wherein said bone engaging projections have a radius as measured from the central longitudinal axis of said body, the radius of said bone engaging projections being substantially constant from one of said ends to the other of said ends along at least a portion of the length of said body.
365. (new) The spinal fusion implant of claim 320, wherein said bone engaging projections have an outer locus forming a generally cylindrical configuration along at least a portion of the length of said body.
366. (new) The spinal fusion implant of claim 320, wherein the maximum height of said bone engaging projections is between 0.25 to 2.0 mm.
367. (new) The spinal fusion implant of claim 320, further comprising a hollow.
368. (new) The spinal fusion implant of claim 367, wherein said hollow forms a chamber in communication with said openings, said chamber having an access opening for loading said chamber with fusion promoting substances.

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369. (new) The spinal fusion implant of claim 320, wherein said implant is at least in part bioabsorbable.
